

SPM BULLETIN

ISSUE NUMBER 32: October 2011 CE

1. EDITOR'S NOTE

Dear Friends,

1. By now probably most of you know that Misha Matveev has passed away recently. I quote Ronnie Levy's concise description, distributed via *Topology News*:

Misha Matveev of George Mason University died of an apparent heart attack. He was found in his office at approximately 1 AM on March 17.

Misha was a prolific researcher in general topology. His interests included, but were not limited to, star-covering properties, selection principles (such as the Rothberger and Menger properties), and monotonic covering properties.

From Maddalena (Milena) Bonanzinga, I learned that Misha was thinking then on a research topic for his forthcoming visit to the University of Messina. It is symbolic that such an excellent mathematician passes away while doing mathematics.

I met Misha only once in person, in the 44th annual Spring Topology and Dynamics Conference, Mississippi State University, Mississippi State, USA, 2010, and quickly noticed his humble and kind character. Misha injected many fresh ideas and perspectives into the field, and I always had in mind the hope that one day, I will collaborate with him on some of his new ideas concerning SPM. I have recently visited the University of Messina, one of Misha's favorite places to visit. I was fortunate to collaborate, for my first time, with Filippo Cammaroto, Milena Bonanzinga, Bruno Antonio Pantera, and Andrei Catalioto — all former collaborators of Misha. I was also given the opportunity to make comments and suggestions for a nearly finished paper of Misha with Bonanzinga. This is of some consolation for me. I would like to use this opportunity to thank my friends from Messina for giving me this opportunity.

2. With a sharp change from bad news to good news, I am glad to inform you that the Fourth SPM Workshop will take place on the coming June (2012). A preliminary announcement is given below. Please circulate this information among your friends, students, and colleagues.

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2. IV WORKSHOP ON COVERINGS, SELECTIONS AND GAMES IN TOPOLOGY

Dear colleague,

Next year, our mutual friend Ljubiša Kočinac turns 65. For this occasion, I am organizing the *IV Workshop on Coverings, Selections and Games in Topology*. Ljubisa Kocinac initiated and started this series of conferences in 2002, Lecce, Italy.

The workshop will take place at the Department of Mathematics, Seconda Università di Napoli, Caserta, Italy.

Tentative time table: 25–30 June 2012. (Arrival: 25, work: 26–28/29, excursion: 29, departure: 30.)

2.1. Organizing Committee. Agata Caserta, Giuseppe Di Maio (chair), Dragan Djurcic.

2.2. Scientific Committee. Alexander V. Arhangel'skii, Giuseppe Di Maio, Ljubisa D.R. Kocinac, Masami Sakai, Marion Scheepers, Boaz Tsaban, C. Guido, R. Lucchetti.

2.3. Further information. Each talk will last about 30 minutes.

Of course, in a period of financial cuts we do not know up to now the support that we can offer to participants, the amount of registration fee, etc.

This is indeed a very preliminary report, written to circulate this important and happy news. We would appreciate your forwarding this information to anyone who may be interested in attending this conference.

On the behalf of the organizing committee, I hope to see you in Caserta.

Giuseppe Di Maio

3. LONG ANNOUNCEMENTS

3.1. Constructing universally small subsets of a given packing index in Polish groups. A subset of a Polish space X is called universally small if it belongs to each ccc σ -ideal with Borel base on X . Under CH in each uncountable Abelian Polish group G we construct a universally small subset $A_0 \subset G$ such that $|A_0 \cap gA_0| = \mathfrak{c}$ for each $g \in G$. For each cardinal number $\kappa \in [5, \mathfrak{c}^+]$ the set A_0 contains a universally small subset A of G with sharp packing index $\sup\{|\mathcal{D}|^+ : \mathcal{D} \subset \{gA\}_{g \in G} \text{ is disjoint}\}$ equal to κ .

<http://arxiv.org/abs/1106.2235>

Taras Banach and Nadya Lyaskovska

3.2. Amenability and Ramsey Theory. The purpose of this article is to connect the notion of the amenability of a discrete group with a new form of structural Ramsey theory. The Ramsey theoretic reformulation of amenability constitutes a considerable weakening of the Følner criterion. As a by-product, it will be shown that in any non

amenable group G , there is a subset E of G such that no finitely additive probability measure on G measures all translates of E equally.

<http://arxiv.org/abs/1106.3127>

Justin Tatch Moore

3.3. Hindman's Theorem, Ellis's Lemma, and Thompson's group F . The purpose of this article is to formulate generalizations of Hindman's Theorem and Ellis's Lemma for non associative groupoids. These conjectures will be proven to be equivalent and it will be shown that they imply the amenability of Thompson's group F . In fact the amenability of F is equivalent to a finite form of the conjectured extension of Hindman's Theorem.

<http://arxiv.org/abs/1106.4735>

Justin Tatch Moore

3.4. A counterexample in the theory of D -spaces. Assuming \diamond , we construct a T_2 example of a hereditarily Lindelöf space of size ω_1 which is not a D -space. The example has the property that all finite powers are also Lindelöf.

<http://arxiv.org/abs/1106.5116>

Daniel T. Soukup, Paul J. Szeptycki

3.5. Borel's Conjecture in Topological Groups. We introduce a natural generalization of Borel's Conjecture. For each infinite cardinal number κ , let BC_κ denote this generalization. Then BC_{\aleph_0} is equivalent to the classical Borel conjecture. We obtain the following consistency results:

- (1) If it is consistent that there is a 1-inaccessible cardinal then it is consistent that BC_{\aleph_1} holds.
- (2) If it is consistent that BC_{\aleph_1} holds, then it is consistent that there is an inaccessible cardinal.
- (3) If it is consistent that there is a 1-inaccessible cardinal with ω inaccessible cardinals above it, then $\neg BC_{\aleph_\omega} + (\forall n < \omega) BC_{\aleph_n}$ is consistent.
- (4) If it is consistent that there is a 2-huge cardinal, then it is consistent that BC_{\aleph_ω} holds.
- (5) If it is consistent that there is a 3-huge cardinal, then it is consistent that BC_κ holds for a proper class of cardinals κ of countable cofinality.

<http://arxiv.org/abs/1107.5383>

Fred Galvin and Marion Scheepers

3.6. The topology of ultrafilters as subspaces of 2^ω . Using the property of being completely Baire, countable dense homogeneity and the perfect set property we will be able, under Martin's Axiom for countable posets, to distinguish non-principal ultrafilters on ω up to homeomorphism. Here, we identify ultrafilters with subspaces of 2^ω in the obvious way. Using the same methods, still under Martin's Axiom for countable posets, we will construct a non-principal ultrafilter $\mathcal{U} \subseteq 2^\omega$ such that \mathcal{U}^ω

is countable dense homogeneous. This consistently answers a question of Hrušák and Zamora Avilés. Finally, we will give some partial results about the relation of such topological properties with the combinatorial property of being a P-point.

<http://arxiv.org/abs/1108.2533>

Andrea Medini and David Milovich

3.7. Another note on the class of paracompact spaces whose product with every paracompact space is paracompact. Abstract. The paper contains the following two results:

- (1) Let X be a paracompact space and M be a metric space such that X can be embedded in M^{\aleph_1} in such a way that the projections of X onto initial countably many coordinates are closed. Then the product $X \times Y$ is paracompact for every paracompact space Y if and only if the first player of the $G(DC, X)$ game, introduced by Telgarsky, has a winning strategy.
- (2) If X is paracompact space, Y is a closed image of X and the first player of the $G(DC, X)$ game has a winning strategy, then also the first player of the $G(DC, Y)$ game has a winning strategy.

K. Alster

3.8. On paracompactness in the Cartesian products and the Telgarsky's game. Let X be a paracompact space and M be a metric space such that X can be embedded in M^{\aleph_1} in such a way that the projections $p_\alpha : X \rightarrow M^\alpha$ are closed at every $x \in X$, and $p_\alpha^{-1}p_\alpha(x)$ is clopen for all $x \in X$. Then the product $X \times Y$ is paracompact for every paracompact space Y if and only if the first player of the $G(DC, X)$ game, introduced by Telgarsky, has a winning strategy.

K. Alster

3.9. Elementary chains and compact spaces with a small diagonal. It is a well known open problem if, in ZFC, each compact space with a small diagonal is metrizable. We explore properties of compact spaces with a small diagonal using elementary chains of submodels. We prove that ccc subspaces of such spaces have countable π -weight. We generalize a result of Gruenhage about spaces which are metrizable fibered. Finally we discover that if there is a Luzin set of reals, then every compact space with a small diagonal will have many points of countable character.

<http://arxiv.org/abs/1109.1736>

Alan Dow and Klaas Pieter Hart

4. SHORT ANNOUNCEMENTS

4.1. On large indecomposable Banach spaces.

<http://arxiv.org/abs/1106.2916>

Piotr Koszmider

4.2. A $C(K)$ Banach space which does not have the Schroeder-Bernstein property.

<http://arxiv.org/abs/1106.2917>

Piotr Koszmider

4.3. Linearly Ordered Families of Baire 1 Functions.

<http://arxiv.org/abs/1109.5281>

Márton Elekes

4.4. Chains of Baire class 1 functions and various notions of special trees.

<http://arxiv.org/abs/1109.5283>

Márton Elekes and Juris Steprāns

4.5. Transfinite Sequences of Continuous and Baire Class 1 Functions.

<http://arxiv.org/abs/1109.5284>

Márton Elekes and Kenneth Kunen

5. UNSOLVED PROBLEMS FROM EARLIER ISSUES

Issue 1. Is $\left(\frac{\Omega}{\Gamma}\right) = \left(\frac{\Omega}{\Gamma}\right)$?

Issue 2. Is $U_{\text{fin}}(\mathcal{O}, \Omega) = S_{\text{fin}}(\Gamma, \Omega)$? And if not, does $U_{\text{fin}}(\mathcal{O}, \Gamma)$ imply $S_{\text{fin}}(\Gamma, \Omega)$?

Issue 4. Does $S_1(\Omega, \Gamma)$ imply $U_{\text{fin}}(\Gamma, \Gamma)$?

Issue 5. Is $\mathfrak{p} = \mathfrak{p}^*$? (See the definition of \mathfrak{p}^* in that issue.)

Issue 6. Does there exist (in ZFC) an uncountable set satisfying $S_{\text{fin}}(\mathcal{B}, \mathcal{B})$?

Issue 8. Does $X \notin \text{NON}(\mathcal{M})$ and $Y \notin \text{D}$ imply that $X \cup Y \notin \text{COF}(\mathcal{M})$?

Issue 9 (CH). Is $\text{Split}(\Lambda, \Lambda)$ preserved under finite unions?

Issue 10. Is $\text{cov}(\mathcal{M}) = \mathfrak{od}$? (See the definition of \mathfrak{od} in that issue.)

Issue 12. Could there be a Baire metric space M of weight \aleph_1 and a partition \mathcal{U} of M into \aleph_1 meager sets where for each $\mathcal{U}' \subset \mathcal{U}$, $\bigcup \mathcal{U}'$ has the Baire property in M ?

Issue 14. Does there exist (in ZFC) a set of reals X of cardinality \mathfrak{d} such that all finite powers of X have Menger's property $S_{\text{fin}}(\mathcal{O}, \mathcal{O})$?

Issue 15. Can a Borel non- σ -compact group be generated by a Hurewicz subspace?

Issue 16 (MA). Is there $X \subseteq \mathbb{R}$ of cardinality continuum, satisfying $S_1(\mathcal{B}_\Omega, \mathcal{B}_\Gamma)$?

Issue 17 (CH). Is there a totally imperfect X satisfying $U_{\text{fin}}(\mathcal{O}, \Gamma)$ that can be mapped continuously onto $\{0, 1\}^{\mathbb{N}}$?

Issue 18 (CH). Is there a Hurewicz X such that X^2 is Menger but not Hurewicz?

Issue 19. Does the Pytkeev property of $C_p(X)$ imply that X has Menger's property?

Issue 20. Does every hereditarily Hurewicz space satisfy $S_1(\mathcal{B}_\Gamma, \mathcal{B}_\Gamma)$?

Issue 21 (CH). Is there a Rothberger-bounded $G \leq \mathbb{Z}^{\mathbb{N}}$ such that G^2 is not Menger-bounded?

Issue 22. Let \mathcal{W} be the van der Waerden ideal. Are \mathcal{W} -ultrafilters closed under products?

Issue 23. Is the δ -property equivalent to the γ -property $\left(\frac{\Omega}{\Gamma}\right)$?

Previous issues. The previous issues of this bulletin are available online at <http://front.math.ucdavis.edu/search?&t=%22SPM+Bulletin%22>

Contributions. Announcements, discussions, and open problems should be emailed to tsaban@math.biu.ac.il

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